Rhodora

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—No. CLXIX.

Part II. STUDIES OF EASTERN AMERICAN PLANTS

M. L. Fernald

(*Continued from page 57*)

3. Some Varieties in Oenothera (Plates 1137–1143)

In studying the true Oenotheras of the "Manual range" I have, unfortunately, been unable to compile from a treatment of the group, such as Dr. Philip A. Munz has so satisfactorily supplied for the other subgenera. The long hoped-for study by him of § *Onagra* is still anxiously awaited. In the meantime the necessity to do something with this most variable and perplexing series (made more perplexing through the evident hybridization of species and the superabundance of vegetative mutants which have been described as "species") has necessitated two weeks of sorting and resorting of many hundreds of collections. It is gratifying to note that the primary distinctions several times emphasized by Wiegand seem to be of fundamental importance. Aside from the cultivated and escaped *O. grandiflora* Ait. (including the very similar *O. grandiflora* Lam. or *O. Lamarckiana* Ser.) and the Alleghenian *O. argillicola* Mackenzie (seeds shown in plate 1138, fig. 11), we have what seem like three primary species, with fairly definite characters in habit, calyx and seeds. These technical but seemingly well established characters are shown in the plates prepared with her usual care by Dr. Schubert.

I am taking up *O. biennis* in the long-accepted sense, although much argument has been published, to the effect that something which had long been cultivated in Europe, and which had

spread to the open in northwestern continental Europe, cannot be matched with anything American. Before me, however, is a photograph of a plant which Linnaeus described in Hortus Cliffortianus, marked by him "*biennis*", which shows the distant, thin and spreading-ascending leaves, the tips of the calyx-lobes united at base into a definite tube and other characters which strikingly suggest *O. biennis* as interpreted by Robinson & Fernald and by Wiegand. A specimen in the Linnaean Herbarium (no. 484.1), which Linnaeus had before him in preparing ed. 1 of Species Plantarum, is also characteristic of the species as understood (very like the Hort. Cliff. specimen). Furthermore, specimens from various parts of Europe are the same; thus, material growing on dunes of the Ostfriesisch Inseln and sent by the late Professor Buchenau as *O. muricata* L. is partly of that plant, partly (our PLATE 1137, FIG. 1) of *O. biennis*.

O. biennis, then, has the membranaceous leaves minutely soft-pilose beneath, lanceolate to lance-oblong or sometimes oblong-ovate; the bracts of the inflorescence (except in one local var.) shorter and finally deciduous, leaving a naked fruiting spike; the calyx-lobes in the unexpanded buds with the slender tips closely connivent or parallel at base, thus forming a tube (PLATE 1137, FIGS. 1–4 and PLATE 1138, FIGS. 1–3, 7 and 9); the expanded and reflexed calyx-lobes (PLATE 1137, FIGS. 4, 5, 8 and 9, and PLATE 1138, FIGS. 5 and 8) 1–2.5 cm. long and arching or extending straight back (not deflected by the auricle). The fully mature seeds are 1.2–1.8 (–2) mm. long and 0.6–1.2 mm. broad, their angles (under magnification) with very narrow wings (PLATE 1137, FIGS. 6 and 10, and PLATE 1138, FIGS. 6 and 10). This collective species has four well defined geographic varieties. Typical *O. biennis* (PLATE 1137, FIGS. 1–6) or var. *vulgaris* Torr. & Gray, has the surfaces of the calyx, ovaries and capsules evident, and more or less villous, or the capsules merely hirsute and 1.5–3.5 cm. long. It is wide-ranging in dry soil from Newfoundland and the Côte Nord of Quebec to southeastern Alberta (local west of Manitoba), south to Nova Scotia, New England, Long Island, northern Florida, Tennessee, Arkansas, North Dakota and Idaho. Among minor trends are *O. comosa*, *grandifolia*, *Hazelae*, *novae-scotiae*, *parva* and *Royfraseri* R. R. Gates and *O. Victorini* Gates & Catcheside.

Very similar but with the often viscid body of the calyx (PLATE 1137, FIGS. 7–10) glabrous or essentially so, the glabrescent capsules only 1–2.5 cm. long, is var. *nutans* (Atkinson & Bartlett[1]) Wiegand in RHODORA, XXVI. 3 (1924), based on *O. nutans* Atkinson & Bartlett in Science, n. s. XXXVII. 717 (1913) and RHODORA, XV. 83 (1913), ranging from New York to Georgia.

The other two most significant varieties have firmer and strongly ascending leaves. Their calyx-lobes, ovaries and capsules have the surfaces hidden by dense canescent or whitish pubescence. Var. *canescens* Torr. & Gray, Fl. N. Am. i. 492 (1840) (our PLATE 1138, FIGS. 1–6) has the pubescence of calyx and capsule of closely appressed and short strigae. It ranges from southern Quebec to southeastern Alberta, south to the coast of eastern New Brunswick, western New York, southern Ontario, Ohio, Illinois, Missouri and Oklahoma, being primarily a variety of the prairies. It includes *O. canovirens* Steele and *O. eriensis*, *niagarensis* and *repandodentata* R. R. Gates and passes insensibly into var. *hirsutissima* Gray in Mem. Am. Acad., n. s. iv[1]. (Pl. Fendl.) 43 (1849) and in Pl. Wright. i. 69 (1852), our PLATE 1138, FIGS. 7–10. Var. *hirsutissima* has the pubescence of capsule and calyx with many ascending to spreading long villi. Gray defined var. *hirsutissima* in peculiarly bifurcate fashion: in Plantae Fendlerianae (1849), enumerating Fendler's New Mexican plants, he had

"218. OENOTHERA BIENNIS, VAR. HIRSUTISSIMA. Valley of Santa Fé Creek, in the mountains; June. Plant 2 to 3 feet high", he completing the description in Plantae Wrightianae three years later: "190. OE. BIENNIS, *Linn.*, var. Along the Limpia.—This is the same strigose-hirsute variety as No. 218, *Pl. Fendl.*, a form which is common in Oregon and along the Rocky Mountains".

This, of course, is the transcontinental plant which was defined as *Onagra strigosa* Rydberg, Mem. N. Y. Bot. Gard. i. 278 (1900) and which was reduced to varietal rank as *Onagra biennis*, var. *strigosa* (Rydb.) Piper in Piper & Beattie, Fl. Palouse Reg. 124 (1901) and transferred to *Oenothera* as *Oenothera strigosa* (Rydb.) Mackenz. & Bush, Man. Fl. Jackson Co., Mo. 139 (1902). The dominant extreme of the species in the cordil-

[1] The citation in Index Londinensis of H. H. Bartlett as "Bartl." is misleading, in view of the long use of that abbreviation for Bartling.

leran region, var. *hirsutissima* is found in the East, especially near the coast. Its broad range is from southern Quebec to western British Columbia, south to Prince Edward Island, southern New England, New Jersey, Pennsylvania, Michigan, Illinois, Kansas, Texas, New Mexico, Arizona and northern Mexico.

Just as *Oenothera biennis* has more or less defined geographic varieties with pronounced differences in the density of pubescence of calyx, capsule, etc. but with the same form of calyx-lobes and with small seed with evident thin and narrowly winged angles, so do the other two most common species of the East present somewhat definite varieties along parallel lines. In these two species the calyx has the slender tips not connivent and forming a tube at base; but in the bud they are distinct to base and somewhat distant (PLATE 1139, FIGS. 1 and 2 and 4, 5, 6 and 8, PLATE 1140, FIGS. 1 and 2, PLATE 1141, FIGS. 1–4, and PLATES 1142 and 1143. The auricle at junction of blade and slender tip is rather prominent and in the expanded calyx the tip is somewhat deflected, instead of continuing the direction of the blade, being usually 1–3 (rarely –5) mm. long. In these species the fully developed seeds are plump and larger than in *O. biennis* and filled out to the angles, which lack or nearly lack the evident thin and narrow wing (seen under magnification) of the latter species.

The first of these two is *Oenothera parviflora* L., Syst. ed. 10: 998 (1759) and Sp. Pl. ed. 2: 492 (1762) or *O. muricata* L. Syst. ed. 12: 263 (1767). The first description of Linnaeus was brief and misleading, for the emphasis was placed on a supposed 8-cleft summit of the fruit: "*Margo coronans fructum, non uti praecedentis quadrifidus, sed octofidus est*"; but the full description of 1762 was most satisfactory in saying: "Caulis *pilis adspersus, sed absque tuberculis ad eorum basin* . . . Calyx *tubo* . . . *infra apicem denticulo notatus, hinc ante explicationem mucrones in hac distantes*". The specimen in the Linnaean Herbarium (sheet 484.2) clearly marked by him as "*parviflora*" (photograph, like those of *O. biennis* and *O. muricata*, unfortunately too weak for reproduction) is a flowering one, with the long bracts and perfectly characteristic calyx of the plant identified by Wiegand as *O. parviflora*. Similarly, Linnaeus's type of *O. muricata*

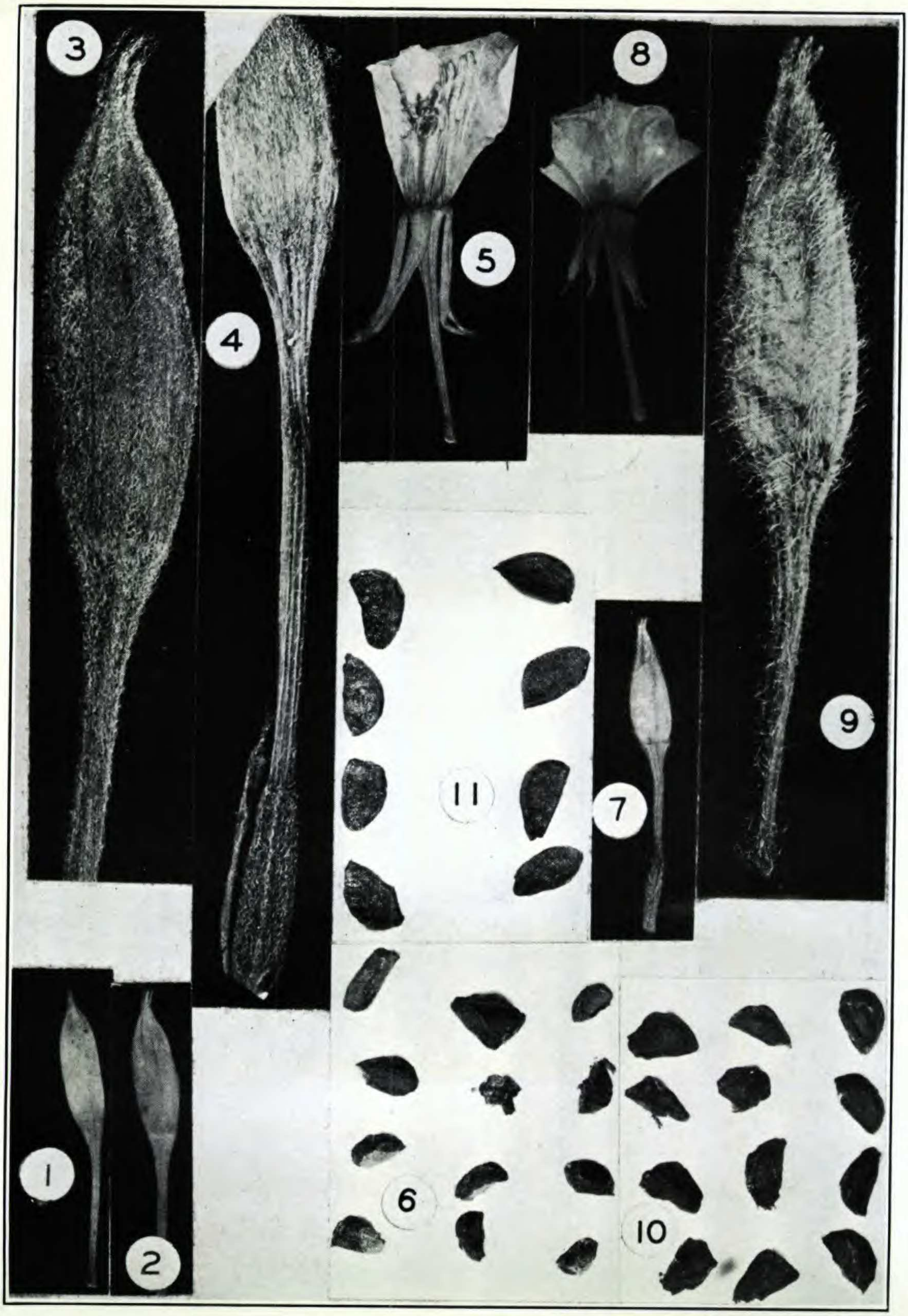

Photo. B. G. Schubert

OENOTHERA BIENNIS, var. CANESCENS: FIG. 1, calyx, × 1, from Saskatchewan; FIG. 2, calyx, × 1, from isotype of *O. canovirens* Steele; FIG. 3, calyx, × 3, from same plant as fig. 2; FIG. 4, ovary and portion of calyx, × 3, from Iowa; FIG. 5, expanded flower, × 1, from Saskatchewan; FIG. 6, seeds, × 5, from Iowa.

O. BIENNIS, var. HIRSUTISSIMA: FIG. 7, calyx, × 1, from Wyoming; FIG. 8, expanded flower, × 1, from Idaho; FIG. 9, calyx, × 3, from Wyoming; FIG. 10, seeds, × 5, from Vancouver Island.

O. ARGILLICOLA: FIG. 11, seeds, × 5, from West Virginia.

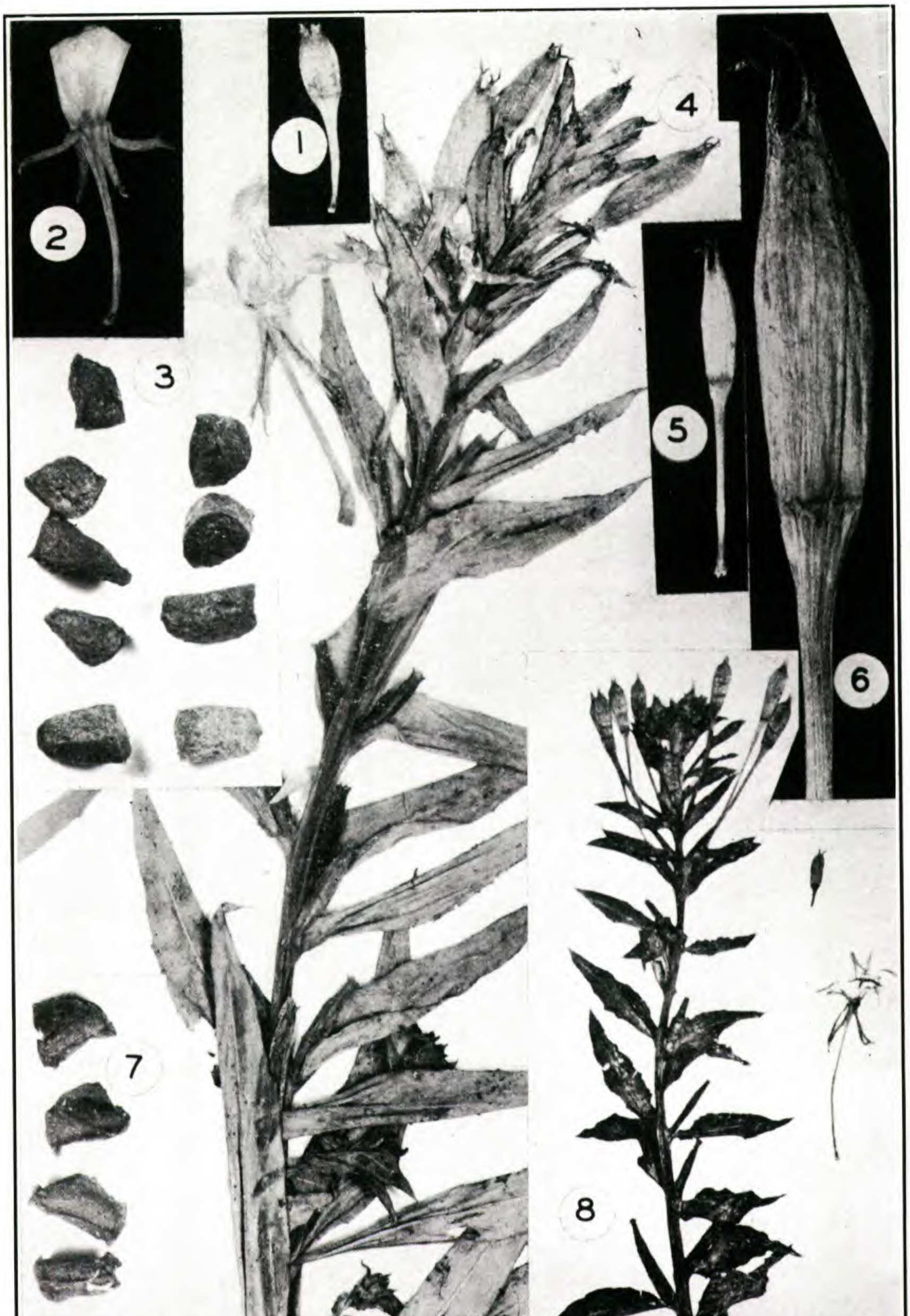

Photo. B. G. Schubert

OENOTHERA PARVIFLORA: FIG. 1, calyx, × 1, from Quebec; FIG. 2, expanded flower, × 1, from Quebec; FIG. 3, seeds, × 5, from Prince Edward Island.

O. PARVIFLORA, var. ANGUSTISSIMA: FIG. 4, summit of plant, × 1, from New York; FIG. 5, calyx, × 1, from same plant as fig. 4; FIG. 6, same calyx, × 3.

O. PARVIFLORA, var. OAKESIANA: FIG. 7, seeds, × 5, from Massachusetts.

O. CRUCIATA: FIG. 8, portion of TYPE, × ca. ½.

Photo. B. G. Schubert

OENOTHERA PARVIFLORA, var. OAKESIANA: FIG. 1, summit of TYPE of O. OAKESIANA Robbins, × 1; FIG. 2, bud, × 1, from topotype of *O. Tidestromi;* FIG. 3, ovary and portion of calyx, × 3, from same plant as fig. 2.

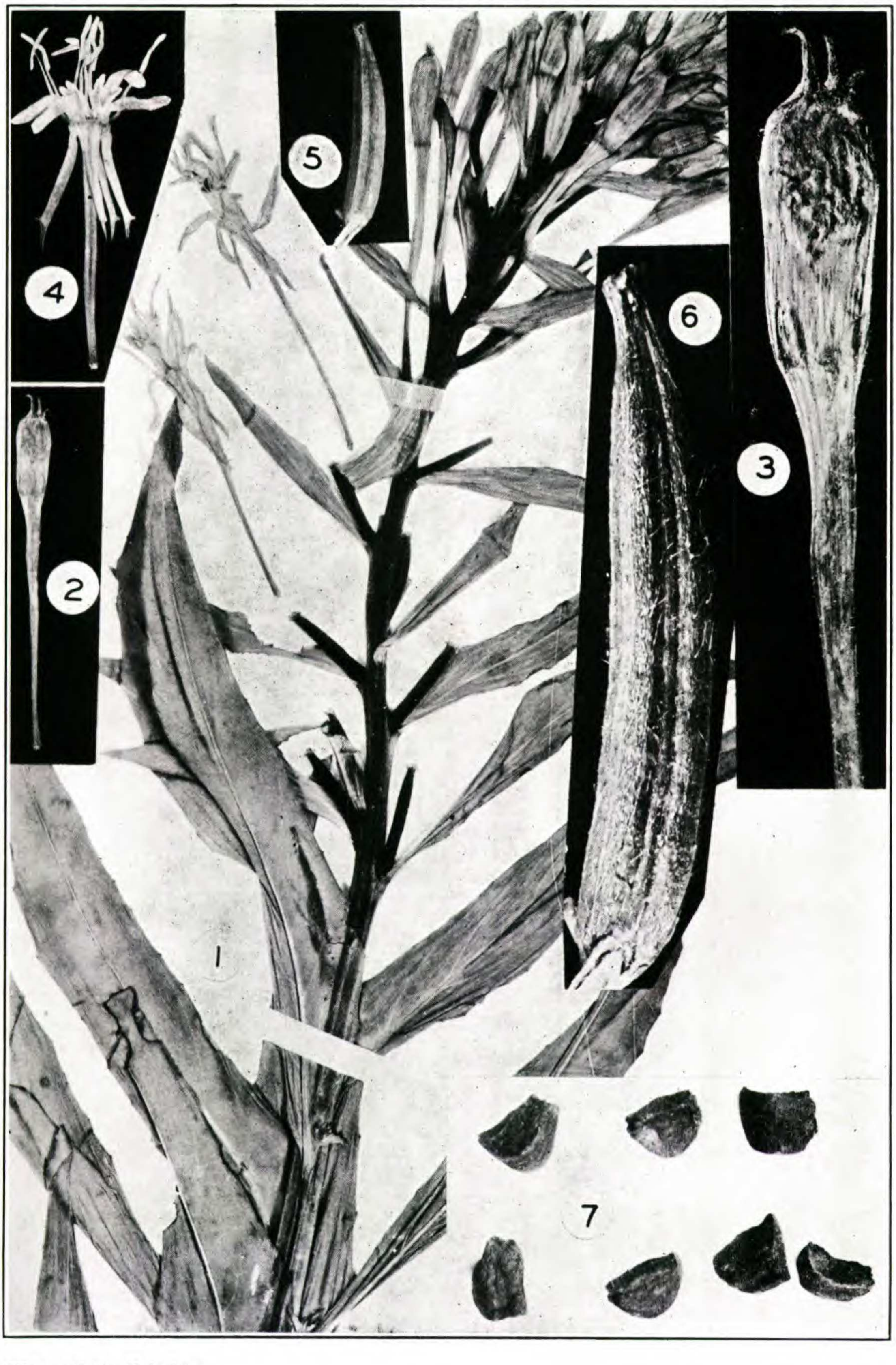

Photo. B. G. Schubert

OENOTHERA CRUCIATA: FIG. 1, summit of plant, × 1, from New Hampshire; FIG. 2, calyx, × 1, from Maine; FIG. 3, same calyx, × 3; FIG. 4, expanded flower, × 1, from same plant as figs. 2 and 3; FIG. 5, capsule, × 1, from New York; FIG. 6, same capsule, × 3; FIG. 7, seeds, × 5, from New Hampshire.

(sheet 484.3) is from an older plant, with well developed capsules subtended by long ascending bracts, the calyx-tips as in the earlier published *O. parviflora*. This is most fortunate, for no change of interpretation is necessitated.

Oenothera parviflora, then, is characterized by its free calyx-tips, with evident auricle which deflects the tip; by its obovate petals; its simple or rarely branching stem 1–8 dm. high; the foliage-leaves passing without obvious change into the bracts, which are prolonged and which persist on the leafy-bracted fruiting spike; and by the large (2–2.6 mm. long, 1–1.8 mm. broad) and plump seeds without any or with scarcely any thin wings.

The typical variety has the upper (often the lower) half of the stem beset with long spreading hairs, often on enlarged reddish pustular bases; the fresh leaves rather fleshy and firm, ascending, strigose to glabrescent beneath; calyx and capsule more or less strigose-villous. It abounds on gravelly shores, talus (often calcareous), sands and dry open soil from Newfoundland and the Côte Nord of Quebec to James Bay and the Thunder Bay District of Ontario, south to Nova Scotia, New England and New York. Var. *angustissima* (R. R. Gates) Wiegand in RHODORA, XXVI. 3 (1924), based on *Oenothera angustissima* R. R. Gates in RHODORA, XV. 46, pl. 100 and 101 (1913), differs in the stem, leaves, calyx and capsule being glabrous or essentially so (our PLATE 1139, FIGS. 4–6), thus paralleling *O. biennis*, var. *nutans* and, like it, chiefly Alleghenian, known from southwestern Quebec to western New York, south to the District of Columbia and West Virginia.

The third variety of *O. parviflora* is the chiefly coastal extreme with close and canescent, minute pubescence on stem, lower leaf-surfaces, backs of calyx-lobes and capsules, *O. Oakesiana* Robbins. This plant, with all the general characters of *O. parviflora* but with the auricle at summit of the calyx-lobes often longer and more conical than in typical *O. parviflora*, had a rather shaky nomenclatural start. Robbins sent a sheet of it (PLATE 1140, FIG. 1) to Asa Gray, with this label:

> "*Oenothera Oakesiana*, sp. ined. Robbins
> Annua, Oe. bienni minor; pubescentiâ molliore, adpressa; apicibus calycis divergentibus; caps. longiori, acutiori; seminibus majoribus.

Foliis insuper angustioribus, agrestum ad Norton, Mass. in arenosis, cultam ex seminibus ad Apponaug, R. I., lectis Aug., 1865 et legit ad New Haven, Conn., primum 1827."

Gray immediately took it up in his Man. ed. 5: 178 (1867) but as *O. biennis*, "Var. 5. Oakesiàna (OE. Oakesiana, *Robbins*)", Robbins's binomial thus published technically as a synonym. Sereno Watson did not do much better in his *Revision of the extra-tropical North American Species of the Genus Oenothera*, for there, in Proc. Am. Acad. viii. 579 (1873), under an all-inclusive *O. biennis*, he said: "The more strigose form is *OE. muricata*, Murr.; the more softly pubescent is *OE. Oakesiana*", without any author cited. In his Bibliographical Index, 383 (1878), however, the plant came into full recognition as "**OE. Oakesiana.** Robbins, in herb." with the two previously noted publications obscurely cited in the synonymy. But in these and later shifts of the name Robbins's noting of the two most significant characters, "apicibus calycis divergentibus" and "seminibus majoribus", was quite ignored. Robbins understood his plant; those who published it did not! In all its characters, except the cinereous and very fine pubescence, it is inseparable from *O. parviflora*. I am, therefore, calling it

O. parviflora L., var. **Oakesiana** (Robbins), comb. nov. *O. biennis*, var. *Oakesiana* (*O. Oakesiana* Robbins) Gray, Man. ed. 5: 178 (1867). *O. Oakesiana* as a binomial "form" of *O. biennis*, S. Wats. in Proc. Am. Acad. viii. 579 (1873). *O. Oakesiana* Robbins in herb. in S. Wats. Bibl. Index, 383 (1878). *O. Oakesiana* Robbins ex Wats. & Coult. in Gray, Man. ed. 6: 190 (1890). *Onagra Oakesiana* Britton in Mem. Torr. Bot. Cl. v. 233 (1894). *Oe. Tidestromii* Bartlett in Cybele Columb. i. 54, pl. 5 (1914).—Sands along the coast and rarely inland, Plymouth and Worcester Counties, Massachusetts, to Northampton County, Virginia. Plate 1140.

The second species with the tips of the calyx-lobes deflected above the auricle and the seeds plump and relatively large is *O. cruciata* Nutt. in G. Don, Syst. ii. 686 (1832) or *O. biennis*, ε. *cruciata* (Nutt.) Torr. & Gray, Fl. N. Am. i. 492 (1840) (our plate 1139, fig. 8, and plate 1141). Typical *O. cruciata* is habitally much like *O. biennis* and mostly with ascending branches, the cauline leaves membranaceous, acute and distant, leaving long reddish internodes exposed, minutely pilose beneath;

and the bracts quickly fall after the flowering, thus leaving long naked spikes of capsules. In these characters it would go with *O. biennis;* but its calyx-lobes are much as in *O. parviflora*, with tips free in the bud and in the expanded lobes deflected, the petals linear and only 1–3 mm. broad, the longest styles only up to 1.2 cm. long, and the seeds (PLATE 1141, FIG. 7) plump and as large as or larger than in *O. parviflora.* The typical plant, with villous-strigose stem, remote leaves and loosely spreading-villous calyx, is a very characteristic species, especially on gravelly beaches or bars of streams and ponds of a limited area: from southeastern and central Maine to northeastern New York, southward to Middlesex County, Massachusetts, Providence County, Rhode Island, and Hartford County, Connecticut. Quite isolated from the typical plant are two insular departures from it. The first is

O. CRUCIATA Nutt., var. **sabulonensis,** var. NOV., TAB. 1142, caulibus 3–3.5 dm. altis simplicibus adpresse canescento-pilosis; foliis oblongis subobtusis plerumque 1.5–2.5 cm. latis subapproximatis subintegris; calycibus sparse minuteque pilosis; capsulis 8–10 mm. crassis laxe villosis.—NOVA SCOTIA: Sable Island, July 24, 1899, *John Macoun*, no. 21,193; edge of gully in sand-dunes, Sable Island, August 18, 1913, *St. John*, no. 1283 (TYPE in Herb. Gray.).

Var. *sabulonensis*, isolated by 300 miles from the eastern limit of typical *Oenothera cruciata* and with a stretch of 100 miles of sea separating it from the mainland, differs at once from the latter plant in its simple and low stems only 3–3.5 dm. high (in typical *O. cruciata* mostly branching and up to 1 m. high), approximate, instead of distant leaves, these bluntish, oblong and subentire (in typical *O. cruciata* lanceolate, acute and repand-denticulate); calyx minutely and sparsely pilose, instead of villous; capsule 8–10, instead of 5–7 mm. thick. Further material, especially with plenty of flowers and mature seeds, may show other departures.

On the islands of Nantucket and Martha's Vineyard, like Sable Island isolated remnants of the Cretaceous and Tertiary Coastal Plain, *Oenothera cruciata* is represented by

O. CRUCIATA Nutt., var. **stenopetala** (Bicknell), stat. nov., our PLATE 1143. *O. stenopetala* Bicknell in Bull. Torr. Bot. Cl. xli. 79 (1914).

Var. *stenopetala*, described in great detail by Bicknell, was considered by him to have "its real affinity . . . not with *O. cruciata*, a near-relative of *O. biennis*, but rather with *O. Oakesiana* with which it agrees closely in pubescence and to some extent in the form of the capsule". Perhaps so, but Bicknell's characterization of *O. cruciata* shows considerable unfamiliarity with that plant. His "bracts subtending the flowers [in *O. cruciata*] are broad based, not narrowly tapering or petiolulate" is unfortunate in view of the bracts of *O. cruciata* (summit of Nuttall's type in PLATE 1139, FIG. 8). The very narrow petals and the tendency to elongate branching (ISOTYPE in PLATE 1143, FIG. 1) seem to me to ally *O. stenopetala* with *O. cruciata*, but the question is far from settled. The plant is distinguished by its slender stem cinereous with crowded minute appressed pubescence; narrowly lanceolate or oblanceolate acute and repand-denticulate firm leaves only 0.4–1.5 cm. broad, these closely cinereous-strigose beneath; calyx and capsule similarly cinereous. As already noted, its status is still not wholly clear. It is an *Oenothera!*

O. TETRAGONA Roth, var. **hybrida** (Michx.), comb. nov. *O. hybrida* Michx. Fl. Bor.-Am. i. 225 (1803). *Kneiffia tetragona*, var. *hybrida* (Michx.) Pennell in Bull. Torr. Bot. Cl. xlvi. 371 (1919). *O. tetragona*, var. *Fraseri* (Pursh) Munz, forma *hybrida* (Michx.) Munz in Bull. Torr. Bot. Cl. lxiv. 300 (1937).

O. TETRAGONA, var. **latifolia** (Rydb.), stat. nov. *Kneiffia latifolia* Rydb. in Torreya, xxvii. 86, pl. 3 (1927). *O. tetragona*, var. *Fraseri*, forma *latifolia* (Rydberg) Munz, l. c. 301 (1937).

Although Munz treats these two plants as mere forms of *Oenothera tetragona*, var. *Fraseri* (based on *O. Fraseri* Pursh, Fl. Am. Sept. ii. 734 (1814)), the first "Like var. *Fraseri* but with spreading hair on stems, leaf-veins, etc.", the second "Like var. *Fraseri*, but finely strigose", the differences seem to me more than direction and abundance of trichomes. *O. Fraseri* is glabrous throughout, apparently inseparable from *O. glauca* Michaux, Fl. Bor.-Am. i. 224 (1803), a photograph of the type before me; *O. Fraseri* (at least plants raised from Fraser's seeds) illustrated in Bot. Mag. xl. t. 1674 (1814), with citation of Pursh's description. *O. glauca* was well illustrated in Bot. Mag. xxxix. t. 1606 (1814). Not only is var. *Fraseri* glabrous; its oval to broadly ovate leaves are mostly 2–4 cm. broad, with only

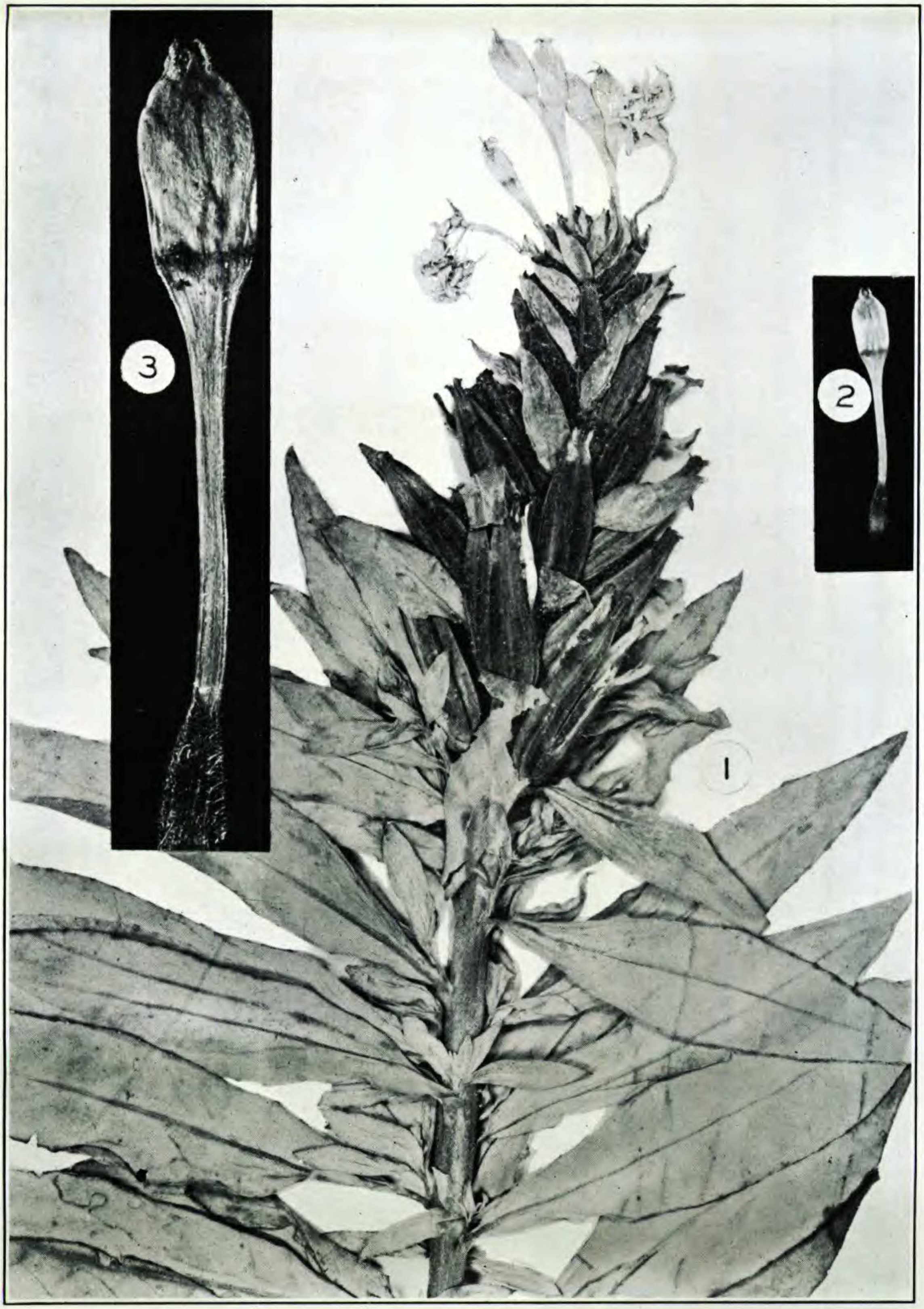

Photo. B. G. Schubert

OENOTHERA CRUCIATA, var. SABULONENSIS, all figs. from TYPE: FIG. 1, upper half of plant, × 1; FIG. 2, bud, × 1; FIG. 3, same bud, × 3.

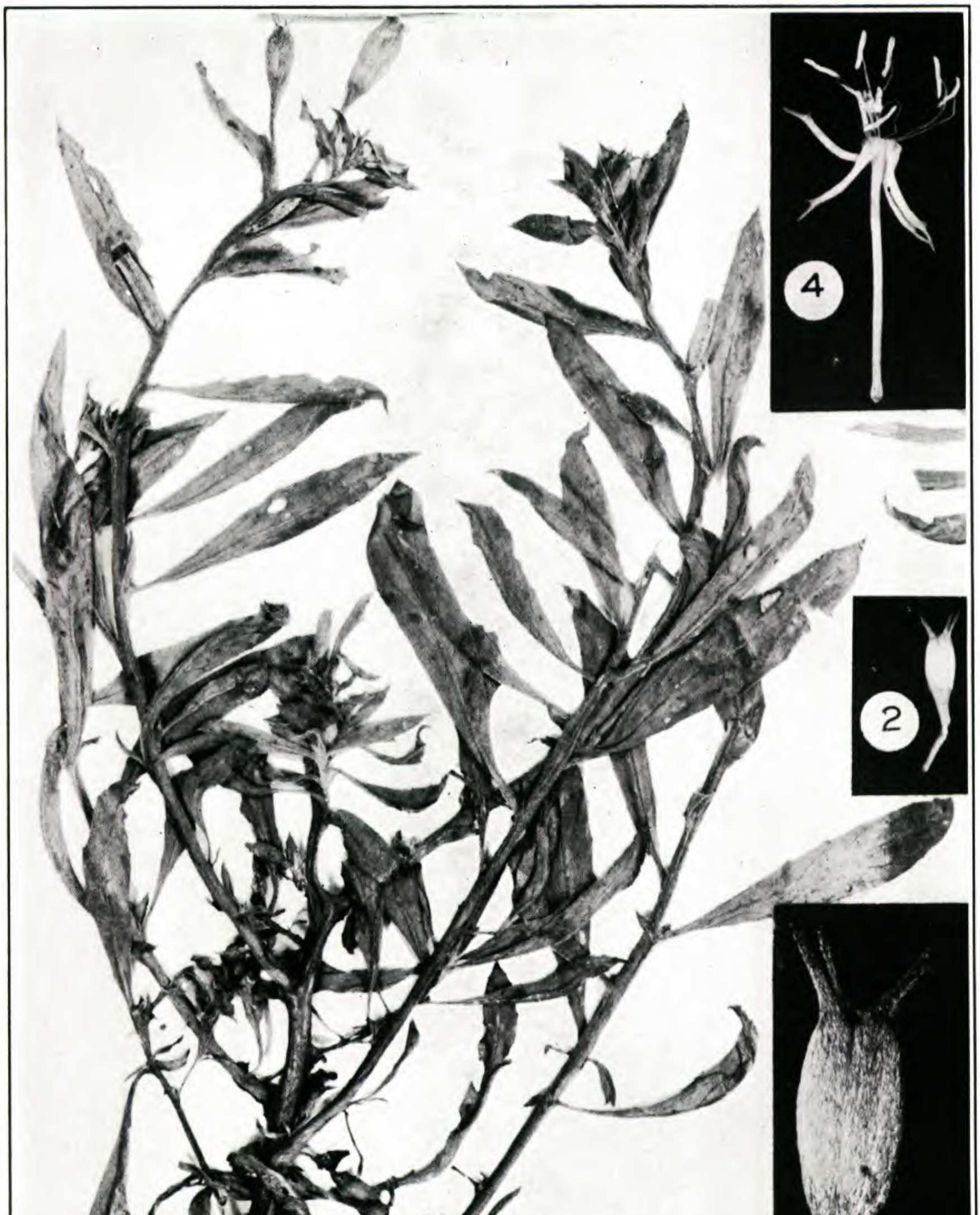

Photo. B. G. Schubert

OENOTHERA CRUCIATA, var. STENOPETALA: FIG. 1, isotype, × 1, of *O. stenopetala* Bicknell; FIG. 2, calyx, × 1, FIG. 3, calyx, × 3, and FIG. 4, expanded flower, × 1, all from type-region, Nantucket Island, Massachusetts.

1–3 (rarely –4) low dentations per 2 cm. of margin, the leaves usually not subtending axillary fascicles; its petals 2–3 cm. long. It seems to be restricted to uplands of Virginia, West Virginia, possibly Ohio (Michaux's label of *O. glauca* reading: "Ouest de Ohio Route aux Illinois") and south along the mountains into western North Carolina and eastern Tennessee.

Vars. *hybrida* and *latifolia*, on the other hand, are both usually pubescent and both have lanceolate to narrowly lance-ovate leaves, the largest ones only 1–2 cm. broad (in the types of both 1 cm. broad), and their margins have 4–6 teeth per 2 cm.; in practically all specimens suppressed axillary branches or fascicles are abundant, and the petals may be as short as 1 cm. (not with a minimum of 2.5 cm.). Var. *hybrida*, characterized by spreading pubescence on stem, leaves, calyx and capsule, extends from the upland of Tennessee and North Carolina out to the inner margin of the Coastal Plain of Virginia. Var. *latifolia* extends from the mountains of eastern Tennessee and western North Carolina north into eastern West Virginia, northern Virginia (Clarke Co.) and southern Pennsylvania (Fayette and York Cos.). With narrower leaves, abundant axillary fascicles, development of pubescence, usually smaller petals and wider ranges eastward or northward, they are not satisfactorily treated as merely pubescent forms of var. *Fraseri*.

Explanation of Plates 1137–1142

Plate 1137. Oenothera biennis L.: fig. 1, portion of plant, × 1, from dunes of the Ostfriesische Inseln, August 12, 1900, *Buchenau;* fig. 2, calyx, × 1, from Ile de Brion, Magdalen Islands, Quebec, *St. John*, no. 1937; fig. 3, calyx, × 3, from Sheffield, Massachusetts, June 15, 1919, *J. R. Churchill;* fig. 4, expanded flower, × 1, from same collection as fig. 3; fig. 5, expanded flower, × 1, from Cass Lake, Minnesota, *A. M. Johnson*, no. 3191; fig. 6, seeds, × 5, from Shelburne, New Hampshire, *A. H. Moore*, no. 4875.

O. biennis, var. nutans (Atkinson & Bartlett) Wieg.: fig. 7, calyx, × 3, from south of Petersburg, Virginia, *Fernald & Long*, no. 9604; fig. 8, expanded flower, × 1, from no. 9604; fig. 9, expanded flower from east of Corinth, Warren Co., New York, *House*, no. 28,028; fig. 10, seeds, × 5, from Garrett Co., Maryland, *Steele*, no. 94.

Plate 1138. Oenothera biennis L., var. canescens Torr. & Gray: fig. 1, calyx, × 1, from Cherryfield, Saskatchewan, *Herriot*, no. 72,378; fig. 2, calyx, × 1, of isotype of *O. canovirens* Steele, from Concord, Morgan Co., Illinois, August 20, 1910, *Steele;* fig. 3, calyx, × 3, from same plant as fig. 2; fig. 4, ovary and portion of calyx, × 3, from Clay Co., Iowa, *Ada Hayden*, no. 10,084; fig. 5, expanded flower, × 1, from *Herriot*, no. 72,378; fig. 6, seeds, × 5, from Story Co., Iowa, August 15, 1933, *Ada Hayden*.

O. biennis, var. hirsutissima Gray: fig. 7, calyx, × 1, from Grand Teton National Park, Wyoming, *L. O. Williams*, no. 965; fig. 8, expanded flower, × 1, from New Plymouth, Idaho, *J. F. Macbride*, no. 733; fig. 9, calyx, × 3,

from *Williams*, no. 965; fig. 10, seeds, × 5, from Harrison Lake, Vancouver Island, *Carter*, no. 249.

O. argillicola Mackenzie: fig. 11, seeds, × 5, from Sweet Springs, West Virginia, *Steele & Steele*, no. 328.

Plate 1139. Oenothera parviflora L.: fig. 1, calyx, × 1, from Rivière à Pierre, Gaspé Co., Quebec, *Pease*, no. 20,303; fig. 2, expanded flower, × 1, from no. 20,303; fig. 3, seeds, × 5, from Cape Aylesbury, Prince Edward Island, *Fernald, Long & St. John*, no. 7835.

O. parviflora, var. angustissima (R. R. Gates) Wieg.: fig. 4, summit of plant, × 1, from general type-area, Lansing, New York, *Eames & Wiegand*, no. 10,461; fig. 5, calyx, × 1, from same plant as fig. 4; fig. 6, calyx, × 3, from same plant as figs. 4 and 5.

O. parviflora, var. Oakesiana (Robbins) Fernald: fig. 7, seeds, × 5, from Provincetown, Massachusetts, *Fernald & Long*, no. 18,845.

O. cruciata Nutt.: fig. 8, portion of type in Herb. Brit. Mus., × ca. ½.

Plate 1140. Oenothera parviflora L., var. Oakesiana (Robbins) Fernald: fig. 1, summit of type, × 1; fig. 2, bud, × 1, from topotype of *O. Tidestromii* Bartlett, from Millstone Landing, St. Marys Co., Maryland, *Blake & Tidestrom*, no. 11,666; fig. 3, ovary and portion of calyx, × 3, from last specimen.

Plate 1141. Oenothera cruciata Nutt.: fig. 1, summit of plant, × 1, from Nelson, New Hampshire, July 9, 1932, *F. W. Batchelder;* fig. 2, calyx, × 1, from Lexington, Maine, *Fernald & Strong*, no. 445; fig. 3, calyx, × 3, from no. 445; fig. 4, expanded flower, × 1, from no. 445; fig. 5, capsule, × 1, from Granville, New York, *F. T. Pember*, no. 20; fig. 6, same capsule, × 3; fig. 7, seeds, × 5, from Rollinsford, New Hampshire, September 2, 1896, *Parlin*.

Plate 1142. Oenothera cruciata Nutt., var. sabulonensis Fernald, all figs. from type: fig. 1, upper half of plant, × 1; fig. 2, bud, × 1; fig. 3, bud, × 3.

Plate 1143. Oenothera cruciata Nutt., var. stenopetala (Bicknell) Fernald: fig. 1, isotype, × 1, of *O. stenopetala* Bicknell, from Nantucket Island, Massachusetts, August 5, 1906, *Bicknell;* fig. 2, calyx, × 1, fig. 3, calyx, × 3, and fig. 4, expanded flower, × 1, all from Nantucket, August 18, 1917, *J. R. Churchill*.

4. Emendations in the Order Tubiflorae

(Plates 1144 and 1145)[1]

Convolvulus spithamaeus L., var. **pubescens** (Gray), comb. nov. *Calystegia sepium* (L.) R. Br., var. *pubescens* Gray, Man. ed. 5: 376 (1867). *Convolvulus sepium* L., var. *pubescens* (Gray) Fernald in Rhodora, x. 55 (1908), as to basonym only. *Calystegia Catesbeiana* Pursh, Fl. Am. Sept. ii. 729 (1814). *Convolvulus Catesbeianus* (Pursh) Ell., Sk. i. 255 (1817). *C. spithamaeus*, var. *Catesbeianus* (Pursh) Tryon in Rhodora, xli. 417 (1939).

Calystegia Catesbeiana Pursh was regularly misinterpreted as a variation of *Convolvulus sepium* L. until in 1939 I secured a photograph of Pursh's type (see Tryon, l. c. pl. 557, fig. 3), when it became apparent that it is the densely pubescent and terminally

[1] The engraving of these plates made possible through a gift from Mr. Bayard Long.

elongate and often twining southern extreme of the white-flowered *Conv. spithamaeus*. Gray and everyone else was misled by Pursh's "C. volubilis, tomentosa" and his "Flowers large, purple" into supposing that Pursh had a very pubescent extreme of the regularly twining and, with us, oftenest roseate-flowered *Convolvulus sepium*. Consequently, although he had no material (see Tryon, l. c. 422), Gray, in publishing *Calystegia sepium*, var. *pubescens*, cited as an absolute synonym of it *C. Catesbeiana*. In his Man. ed. 5 the species of *Calystegia* were: 1. *C. sepium;* 2. *C. spithamaea*. Under *C. sepium* with "the typical form *glabrous* throughout (Convolvulus sepium, and C. repens, *L.*)" Gray added

> "Var. PUBESCENS is a downy form, in the young state approaching the next. (C. Catesbyana *Pursh.*)."

In other words, *Calystegia sepium*, var. *pubescens* was a renaming, as a variety, of *C. Catesbeiana* Pursh and it had no other basis. As the first varietal name used for the latter it must be taken up under the International Rules. The fact that later, in Syn. Fl. ii[1]. 215 (1878), Gray, still not knowing Pursh's type, reduced his own *Calystegia sepium*, var. *pubescens* to his *Convolvulus sepium*, var. *repens* (L.) Gray[2] does not alter the situation, as Tryon, l. c. 422, assumed. Gray, in the Synoptical Flora also included, as a synonym of his inclusive var. *repens*, *Calystegia Catesbeiana* Pursh, for he still supposed it a variation of *Convolvulus sepium* with "herbage from minutely to tomentose-pubescent", "minutely" belonging to *Conv. repens* L., "tomentose-pubescent" to var. *pubescens* (*Calyst. Catesbeiana*). The same interpretation of *Calyst. sepium*, var. *pubescens* (i. e. *C. Catesbeiana*) was made when *Conv. sepium*, var. *pubescens* (Gray) Fernald was published in RHODORA, x. 55 (1908). It was not until we had the photograph of Pursh's type that we realized that his *Calystegia Catesbeiana* did not have "Flowers . . . purple" and that, in reality, it is the southern montane extreme of white-flowered *Convolvulus spithamaeus*. As the first varietal name for the plant, var. *pubescens*, clearly based on *Calystegia*

[2] Although the combination *Convolvulus sepium*, var. *repens* is regularly cited as starting with Gray, Syn. Fl. N. Am. ii[1]. 215 (1878), it was earlier and properly published by Coleman in his Cat. Fl. Pl. So. Pen. Mich. (Kent Sci. Inst. Pub. no. 2), 30 (1874). Coleman should, therefore, be cited as author of the combination.

Catesbeiana, must stand, unless some earlier varietal name for it is found. The name *Conv. spithamaeus*, var. *Catesbeianus* has great merit and is historically clarifying but it is a later varietal name.

Convolvulus sepium L., forma **malachophyllus,** f. nov., foliis cordato-ovatis plerumque 3.5–4 cm. latis utrinque velutino-pilosis; caule pedunculis bracteisque tomentulosis; corollis roseis.—Type from Wickford, Rhode Island, June 17, 1908, *E. F. Williams* in Herb. Gray.

The type, along with several other specimens from a broad area—Anticosti Island to Illinois, Missouri and New Jersey—was distributed as *Convolvulus sepium*, var. *pubescens* (Gray) Fernald; but, as explained in the discussion of *C. spithamaeus*, var. *pubescens*, the nomenclatural basis of that name was badly confused. Forma *malachophyllus* is the very pubescent extreme, allied to *C. sepium*, forma *coloratus* Lange, the roseate-flowered color-form (including var. *americanus* Sims and var. *communis* Tryon) which in America is more frequent than typical white-flowered *C. sepium*, the latter in Europe more common than the roseate-flowered. In view of the fact that approximately 50% of the Eurasian material, there regularly treated as true *C. sepium*, has the leaf of var. *americanus* Sims, as treated by Tryon in Rhodora, xli. 420 (1939), while the other half of the specimens from Eurasia have the leaf of var. *communis* Tryon, l. c. 419, and many American specimens show both types of leaf on the same plant, I have reluctantly given up the effort to keep them apart. I am, however, maintaining var. *fraterniflorus* Mackenzie & Bush as a good geographic variety, not because it has a white corolla, but because the leaf-sinus is distinctive. In all Eurasian material before me (except 1 sheet) and in all American, except for var. *fraterniflorus*, the sinus is U- or V-shaped, with sloping sides. In var. *fraterniflorus*, occurring from Pennsylvania to North Dakota, south to Virginia, Kentucky and Arkansas, all well displayed leaves show a strongly quadrate or nearly square sinus, with parallel sides.[1] This character seems very real. It reappears in a single sheet from Nippon, *Kakuo Uno*, no. 24,144, collected August 17, 1939. From this specimen

[1] Unfortunately the leaf from a topotype shown by Tryon, l. c. pl. 558, fig. 6, has both basal lobes with inner margins folded back, thus obscuring the quadrate sinus.

the familiar range, temperate eastern North America and temperate eastern Asia, is indicated. The sheet from Nippon was distributed as *Calystegia subvolubilis* G. Don, Gen. Syst. iv. 296 (1838), which was a mere transfer of *Convolvulus subvolubilis* Ledeb. Fl. Alt. i. 222 (1829) and Icon. iii. 6, tab. 205 (1831); but *Conv. subvolubilis*, from Dahuria, is wholly different.

Another very striking variety of *Convolvulus sepium* is locally naturalized in western Nova Scotia. Typical *C. sepium* has the leaves acute or acutish and longer than broad, the ovate acute or acutish paired bracts 2–3.5 cm. long, and the white or roseate corolla 4.5–8 cm. high. In western Nova Scotia there also occurs an extreme with suborbicular to round-ovate leaves with blunt to rounded apex, the bracts blunt or round-tipped and only 1.5–2 cm. long, and the white corolla only 4–4.5 cm. high. This seems to be the local Dalmatian var. *dumetorum* Pospichal, Fl. Oesterreich. Küstenlandes, ii. 490 (1898). The two collections are as follows, both from Nova Scotia and distributed as *C. sepium:* roadsides, waste places and ballast-lands, Yarmouth, July 24, 1920, *Long & Linder*, no. 22,326; near a house, grassy or bushy roadsides, Barrington, *Fernald, Long & Linder*, no. 22,327. This variety, occurring near ports, evidently came in shipping from the Adriatic.

Convolvulus pellitus Ledeb., forma **anestius,** stat. et nom. nov. *Calystegia pubescens* Lindl. in Journ. Roy. Hort. Soc. i. 70, with fig. (1846); *Convolvulus pubescens* (Lindl.) Thellung in Viertelj. Naturf. Ges. Zurich, lii. 459 (1907), not *Conv. pubescens* Willd. (1809). *Volvulus japonicus* (Thunb.) Farwell, var. *pubescens* (Lindl.) Farwell in Am. Midl. Nat. xii. 130 (1930).

Convolvulus pellitus, forma *anestius* is the weedy double-flowered plant which has erroneously passed as a form of *C. japonicus* Thunb. That plant (the *Calystegia japonica* (Thunb.) Choisy or *Calysteg. sepium* (L.) R. Br., var. *japonica* (Thunb.) Makino) is, as Dr. Hiroshi Hara clearly demonstrated to me when he spent two years at the Gray Herbarium, wholly different: glabrous, with much longer leaves with 10 to 12 pairs of evident lateral veins, longer bracts up to 3 cm. long and with cordate bases, and the corolla as large as in *Conv. sepium* L. *C. pellitus* Ledeb. Fl. Alt. i. 223 (1829) and Icones, iii. 6, t. 206 (1831) and its double-flowered forma *anestius*, on the other hand, have the

stems and leaves densely soft-pubescent; the subtruncate-based leaves much smaller and with only 3–6 pairs of evident lateral veins; the bracts 1–2.5 cm. long and only gradually rounded (not cordate) at base; the corolla only 4–4.5 cm. high. Typical *Conv. pellitus* with normal simple corolla is rare with us as a weed; the only specimen I have seen (from Massachusetts) coming from an area where waste from woolen-mills abounds. It could have had a quite different origin with us from the common double-flowered plant.

The latter was first noted, apparently, when Lindley described and illustrated it as *Calystegia pubescens* in 1846, Lindley saying:

> "Raised from a very small portion of the root found in a dead Paeony root, in Box No. 22, from Mr. Fortune's mission in China. The box was sent from Shanghai, and stated to contain a plant of the double Convolvulus, which was supposed to be dead when received at the Garden in June, 1844.
>
> This curious plant approaches very nearly to the C. sepium or larger bindweed of our English hedges, from which it differs in having firmer and smaller leaves, much narrower bracts, and a fine pubescence spread over every part. It is the first plant of its order that has been mentioned as producing double flowers. They are about as large as those of a double Anemone, but the petals are arranged with the irregularity of the Rose; they are of a pale very delicate pink, and remain expanded for some days. The calyx is quite unchanged. The exterior petals are very much lacerated and irregular in form; those next the centre are narrow, drawn together into a kind of cone; the next central are completely concealed by those without them, and diminish until they are mere scales, analogous to those which may be found in the first buds which burst in the spring. Not a trace can be found of stamens or pistil."

The same year Lindley essentially reproduced his first account and published a colored plate in Bot. Reg. xxxii. t. 42 (1846), this plate and the account repeated by others. Comparison of Lindley's description and plate with Ledebour's account and beautiful plate of *Convolvulus pellitus* indicates that they are of the same species. However, *Index Kewensis* tells us that *Calystegia* "pubescens, Lindl. . . . = hederacea". *Calystegia hederacea* of Wallich, Cat. was a mere nomen but the Wallich material so named was the basis of *Convolvulus Wallichianus* Spreng. Syst. iv. Cur. Post. 61 (1827), not *Conv. hederaceus* L. (1753). But, obviously, *Conv. Wallichianus* had nothing in common with *Calyst. pubescens* Lindl. The former is very slender and quite glabrous ("utrinque glabris"—Spreng. instead

of "villosus"—Ledeb.), with petioles one half to quite as long as the membranaceous leaf-blade (instead of many times shorter than the firm and thick blade); the broadly hastate base three fourths as broad as to broader than (instead of one third to one half as broad) length of blade; the corolla much shorter.

Convolvulus pellitus, forma *anestius* (homeless) must have been much more in cultivation in the past than at present in the United States. Otherwise it would be most difficult to account for its appearance and spread in abandoned or fallow fields or waste places, on roadsides, etc.; for, producing no seed, it must depend on the unusual vigor (see Lindley's comment) of the slender subterranean parts for propagation. In the Gray Herbarium and that of the New England Botanical Club 37 different stations, all the way from eastern Maine to Michigan, Missouri and Tennessee, are represented, the earliest collection made in 1877, the latest in 1943.

IPOMOEA PANDURATA (L.) G. F. W. Meyer, forma **leviuscula,** nom. nov. Var. *rubescens* Choisy in DC. Prodr. ix. 381 (1845).

In RHODORA, XX. 65 (1918) Blake pointed out that the TYPE of *Convolvulus panduratus* L., therefore of *Ipomoea pandurata*, is the pubescent-leaved form and that, consequently, the "form with leaves glabrous beneath" is Choisy's var. *rubescens*. Choisy's adjective was unfortunate, for both plants have the stem commonly reddish, but he said "caule rubescente glaberrimo ut et foliis". The glabrous and pubescent forms grow somewhat interchangeably in the same areas, so that one may gather material in the same region (southeastern Virginia for example) of either of them. They do not have the geographic segregation one expects of true geographic varieties. I refrain from taking up for a form which differs from the typical plant in its lack of pubescence, the name given it as a variety, since that name is equally descriptive of both forms and, from my viewpoint, would be an absurdity. This case is another to add to those presented by Fassett in RHODORA, l. 249 (1948). Under the wise provision of the International Rules as they have stood for some decades there is no obligation to take over into a new category a name from another category when it would be wholly misleading. Art. 4 of the Rules specially urges us "to avoid or

to reject the use of . . . names which may cause error or ambiguity or throw science into confusion".

A New Polemonium from eastern Pennsylvania (Plates 1144 and 1145).—When in 1892 the late Dr. Britton described the localized *Polemonium Van-Bruntiae* Britton in Bull. Torr. Bot. Cl. xix. 224, pl. 131 (1892) it came as a surprise that in the woodlands of the Atlantic States there was a species so distinct from the much commoner *P. reptans* L. Now that *P. Van-Bruntiae* is well known at scattered spots all the way from western Vermont and New York to the upland of West Virginia[1], Mr. Bayard Long comes forward with another endemic, as yet known only in one limited area of alluvial woods in Montgomery County, Pennsylvania. Growing with the common blue-flowered *P. reptans,* the new plant is strikingly unlike it in many characters. Some years ago Mr. Long referred the plant to me for description, but in deference to others who work primarily on the *Polemoniaceae* I, naturally, refrained from entering polemics over a genus said by some to be named for Polemon of Athens, a Greek philosopher, but by Pliny said to come from *polemos* (war). Now, however, since two specialists on the group have definitely labeled the new plant *P. reptans,* I no longer feel it necessary to withhold publication.

Polemonium reptans (plate 1145, fig. 1), many times illustrated, has the thinnish middle and upper cauline leaves with acute or acutish leaflets; corolla deep blue, 1–1.6 cm. high, completely overtopping the stamens; the style included or barely exserted; the calyx-lobes lanceolate to lance-triangular and acute or acutish. *P. Longii* (plate 1144), on the other hand, has the thick oblong or oblong-oval leaflets obtuse and often bluntly lobulate toward the summit; the calyx-lobes bluntish and broader; corolla red-purple, 7–8 mm. high, much exceeded by the stamens, the style obsolete.

In its long-exserted stamens *Polemonium Longii* is, perhaps, more nearly allied to *P. Van-Bruntiae* (plate 1145, figs. 2 and

[1] The old-fashioned Jacob's-ladder of gardens, *Polemonium caeruleum* L., brought to our gardens from Europe, is occasional in waste and I find specimens of it from so far away from Vermont as rubbish-heaps of Gaspé Co., Quebec, and identified incorrectly by specialists on the group as *P. Van-Bruntiae!* Other perfectly typical *P. caeruleum,* derived from gardens in New Hampshire and originally with correct identifications, has twice been incorrectly annotated as *P. reptans.*

Photo. B. G. Schubert

POLEMONIUM LONGII, all figs. from TYPE: FIGS. 1 and 2, portions of inflorescence, × ca. 1; FIG. 3, cauline leaf, × ca. 1; FIG. 4, flowers, × 3; FIG. 5, calyces, × 3.

Photo. B. G. Schubert

POLEMONIUM REPTANS: FIG. 1, inflorescence and upper leaves, × 1, from western New York.

P. VAN-BRUNTIAE: FIGS. 2 and 3, inflorescence and cauline leaves, × 1, from eastern New York.

3), but it differs from that species as much as it does from *P. reptans*. *P. Van-Bruntiae* has the leaflets tapering to acute or acuminate tips; those of *P. Longii* are obtuse and often lobulate. The corollas of *P. Van-Bruntiae* are blue-purple and 1.2–1.5 cm. long, those of *P. Longii* red-purple and only 7–8 mm. high. During anthesis the calyx of *P. Van-Bruntiae* is 8–12 mm. long, that of *P. Longii* 5–6 mm. long and with blunter and shorter lobes; the anthers of *P. Van-Bruntiae* are 1.8–3 mm. long, the rounder anthers of *P. Longii* 1–1.3 mm. long. In *P. Van Bruntiae* the style is always exserted 3–10 mm., in *P. Longii* obsolete.

In any other genus such characters are specific. Surely, if *Polemonium Longii* is only *P. reptans* with every character different, it is useless to consider the recognition of specific differences in the family (in *Phlox* for example). The fact that it occurred with *P. reptans* is not an argument that it *is* that species. When *P. Van-Bruntiae* chooses a similar habitat we do not call it also *P. reptans;* nor, simply because they both live in Philadelphia and work at the same institution do we consider the discoverer of *Polemonium Longii* identical with the most prolific writer on that group. It is, of course, unfortunate that all the material of the newly proposed species was collected at a single station twenty-three years ago and the type-station later destroyed. Now that attention is called to it and its distinctive characters illustrated many keen botanists will be on the look-out for it. With this possibly polemical introduction I venture to describe

POLEMONIUM **Longii,** sp. nov., TAB. 1144, a *P. reptante* differt foliis crassioribus, foliolis oblongis vel oblongo-ovalibus obtusis plerumque ad apicem 2–3 lobulatis; calycibus 5–6 mm. longis lobis late deltoideis; corollis roseo-purpureis 7–8 mm. longis; staminibus valde exsertis, antheris reniformi-globosis 1–1.3 mm. longis; stylo obsoleto.—Montgomery County, PENNSYLVANIA: alluvial woods along Wissahickon Creek, west of Fort Washington, May 17, 1925, *Bayard Long*, no. 32,357 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.).

In PLATE 1144 all figures are from the TYPE of POLEMONIUM LONGII: FIGS. 1 and 2, portions of inflorescence, × ca. 1; FIG. 3, cauline leaf, × ca. 1; FIG. 4, flowers, × 3; FIG. 5, calyces, × 3.

In PLATE 1145 FIG. 1 shows an inflorescence and upper leaves, × 1, of P. REPTANS L. from along Cattaraugus Creek, Collins, Erie County, New York, *Anne E. Perkins*, no. 68; FIGS. 2 and 3, an inflorescence and cauline leaves,